

## WHAT IS CLAIMED IS:

### 1. A stand frame for an umbrella comprising:

a main shaft composed of an upper tube, a middle tube connected to the upper tube, a lower tube, and a connecting sleeve connecting the middle and the lower tubes;

a stand base substantially mounted on a lower end of the lower tube;

a top cover substantially mounted on an upper end of the upper tube;

a height-adjustable device substantially mounted on the lower tube;

a lower sleeve mounted on the upper tube and being capable of sliding thereon;

a long hanger arm pivotally mounted on the lower sleeve;

a short hanger arm with two ends respectively pivotally connected to the top cover and the long hanger arm;

a fixing support including an L-shaped base section, a rotational section, and a connecting section; an axle passing through the rotational section and the connecting section; the connecting section being connected to the long hanger arm;

an umbrella frame composed of an upper hinge disk, a lower hinge disk, a multi-sectional telescopic tube having two ends the upper hinge disk and the lower hinge disk being respectively mounted at, a plurality of main ribs each pivotally connected to the upper hinge disk and a plurality of connecting ribs each with one end pivotally connected to the lower hinge disk and with the other end connected to a main rib;

an umbrella-opening string with one end tied to the top cover, passing around a pulley atop the umbrella frame, through a connecting column, and into the multi-sectional telescopic tube, and with the other tied to the lower hinge disk;

an upper-tube-pulling string partially wound around a windlass in the height-adjustable device on the lower tube, passing around a pulley at an upper end of the middle tube and below a lower end of the upper tube, and being tied at a bottom of the upper tube; and

a lower-sleeve-pulling string with one end tied to the lower sleeve, passing around a pulley atop the upper tube and entering the upper tube, and with the other tied at a top of the middle tube; a vertical movement of the upper tube driving a corresponding vertical movement of the lower hinge disk by the lower-sleeve-pulling string, causing the long hanger arm to extend or to contract, which makes the umbrella-opening string to open or to close the umbrella frame.

2. The stand frame for an umbrella of claim 1, wherein a self-closed transmission string is on one side wound around a windlass in the height-adjustable device and on the other side wound around a rotor on a separate axle; a gear wheel being coaxial with the rotor and engaged with a gear wheel underneath a connecting sleeve for driving the middle tube attached thereon to rotate horizontally.

3. The stand frame for an umbrella of claim 1, wherein a stepping motor is mounted under the height-adjustable device; a gear wheel of the stepping motor is engaged with a gear wheel having a rotational axle connected through a compressed spring to a connector of an electromagnet mounted in the lower tube; the rotational axle is shifted longitudinally by magnetic attraction and an extending spring when the electromagnet is charged.

4. The stand frame for an umbrella of claim 2, wherein a stepping motor is mounted under the height-adjustable device; a gear wheel of the stepping motor is engaged with a gear wheel having a rotational axle connected through a compressed spring to a connector of an electromagnet mounted in the lower tube; the rotational axle is shifted longitudinally by magnetic attraction and an extending spring when the electromagnet is charged.

5. The stand frame for an umbrella of claim 1, wherein the connecting sleeve has a ring fillister for receiving a corresponding fixing ring formed at the bottom of the lower tube, thereby preventing the connecting sleeve from coming off the lower tube; a hole is formed at a

center of the connecting sleeve for the an upper-tube-pulling string to pass therethrough.

6. The stand frame for an umbrella of claim 2, wherein the connecting sleeve has a ring fillister for receiving a corresponding fixing  
5 ring formed at the bottom of the lower tube, thereby preventing the connecting sleeve from coming off the lower tube; a hole is formed at a center of the connecting sleeve for the an upper-tube-pulling string to pass therethrough.

7. The stand frame for an umbrella of claim 1, wherein the  
10 height-adjustable device comprises a base mounted on the lower tube, a cranking bar extended from the base, an active gear wheel coaxial with the cranking bar, a first passive gear wheel engaged with the active wheel, a second passive gear wheel coaxial with the first passive gear wheel, a windlass coaxial with the first passive gear wheel, a first rotor  
15 integrally mounted on an axis of the second passive gear wheel, a second rotor right above the first rotor with an axis parallel to that of the first rotor, a tapered gear wheel coaxial with the second rotor, and a self-closed transmission string encircling both the first rotor and the second rotor.

20 8. The stand frame for an umbrella of claim 2, wherein the height-adjustable device comprises a base mounted on the lower tube, a cranking bar extended from the base, an active gear wheel coaxial with the cranking bar, a first passive gear wheel engaged with the active wheel, a second passive gear wheel coaxial with the first passive gear  
25 wheel, a windlass coaxial with the first passive gear wheel, a first rotor integrally mounted on an axis of the second passive gear wheel, a second rotor right above the first rotor with an axis parallel to that of the first rotor, a tapered gear wheel coaxial with the second rotor, and a self-closed transmission string encircling both the first rotor and the  
30 second rotor.

9. A stand frame for an umbrella comprising:

a main shaft including an upper tube, a middle tube connected to the upper tube, a lower tube, and a connecting sleeve connecting the middle and the lower tubes;

a stand base substantially mounted on a lower end of the lower tube;

5 a top cover substantially mounted on an upper end of the upper tube;

an angle-adjusting device mounted at the bottom of the upper tube;

a lower sleeve mounted on a section of the upper tube between the top cover and angle-adjusting device;

a long hanger arm pivotally mounted on the lower sleeve;

10 a short hanger arm with two ends respectively pivotally connected to the top cover and the long hanger arm;

a fixing support mounted at an end of the long hanger arm and including an L-shaped base section, a rotational section, and a connecting section; an axle passing through the rotational section and the connecting section; the connecting section being connected to the long hanger arm;

an umbrella frame having an upper hinge disk, a lower hinge disk, a multi-sectional telescopic tube having two ends the upper hinge disk and the lower hinge disk being respectively mounted at, a plurality of main ribs each pivotally connected to the upper hinge disk and a plurality of connecting ribs each with one end pivotally connected to the lower hinge disk and with the other end connected to a main rib;

20 a tilt-control string with one end wound around a first rotor in the angle-adjusting device and with another end passing around a pulley in the lower sleeve, entering the long hanger arm, extending to the rotational section of the fixing support, and being wound around a worm therein; the worm turns a semi-circular gear wheel mounted to the L-shaped base section to tilt the umbrella frame.

10. The stand frame for an umbrella of claim 9, further comprising a rotation-control string having one end wound around a second rotor of the angle-adjusting device and having another end passing around the

pulley in the lower sleeve, entering the long hanger arm, extending to the connecting section of the fixing support, and being wound around a worm therein; the worm turning a gear wheel integrally mounted on an axle to rotate the umbrella frame.

5        11. The stand frame for an umbrella of claim 9, wherein a stepping motor is mounted underneath the angle-adjusting device; a gear wheel of the stepping motor is engaged with a gear wheel having a rotational axle which is connected through a compressed spring to a connector of an electromagnet mounted in the middle tube; the rotational axle is shifted  
10        longitudinally by magnetic attraction and an extending spring when the electromagnet is charged.

12. The stand frame for an umbrella of claim 10, wherein a stepping motor is mounted underneath the angle-adjusting device; a gear wheel of the stepping motor is engaged with a gear wheel having a rotational axle  
15        which is connected through a compressed spring to a connector of an electromagnet mounted in the middle tube; the rotational axle is shifted longitudinally by magnetic attraction and an extending spring when the electromagnet is charged.

13. The stand frame for an umbrella of claim 9, wherein at least one  
20        umbrella frame is used, and each umbrella frame requires an angle-adjusting device.

14. The stand frame for an umbrella of claim 10, wherein at least one umbrella frame is used, and each umbrella frame requires an angle-adjusting device.

25        15. The stand frame for an umbrella of claim 9, wherein the angle-adjusting device comprises a base mounted at an bottom of the upper tube, a cranking bar extended from the base, an active gear wheel coaxial with the cranking bar, a first passive gear wheel engaged with the active wheel, a second passive gear wheel coaxial with the first passive  
30        gear wheel, a first rotor substantially mounted on the first passive gear wheel, a second rotor mounted on the second rotor.

16. The stand frame for an umbrella of claim 10, wherein the angle-adjusting device comprises a base mounted at an bottom of the upper tube, a cranking bar extended from the base, an active gear wheel coaxial with the cranking bar, a first passive gear wheel engaged with the active wheel, a second passive gear wheel coaxial with the first passive gear wheel, a first rotor substantially mounted on the first passive gear wheel, a second rotor mounted on the second rotor.

17. The stand frame for an umbrella of claim 9, wherein a cross section of the upper tube is defined by a round portion with a bulged portion; the middle tube is of circular cross section and is contained by the upper tube within the round portion; and the space of the bulged portion can contains three pull strings.

18. The stand frame for an umbrella of claim 10, wherein a cross section of the upper tube is defined by a round portion with a bulged portion; the middle tube is of circular cross section and is contained by the upper tube within the round portion; and the space of the bulged portion can contains three pull strings.